Recent Studies to Improve Great Lakes Water Levels Management using Shared Vision Planning

Dr. Tony Eberhardt

USACE, Institute for Water Resources

Planning Community of Practice Conference
San Antonio, TX – May 19-22, 2008

Background:

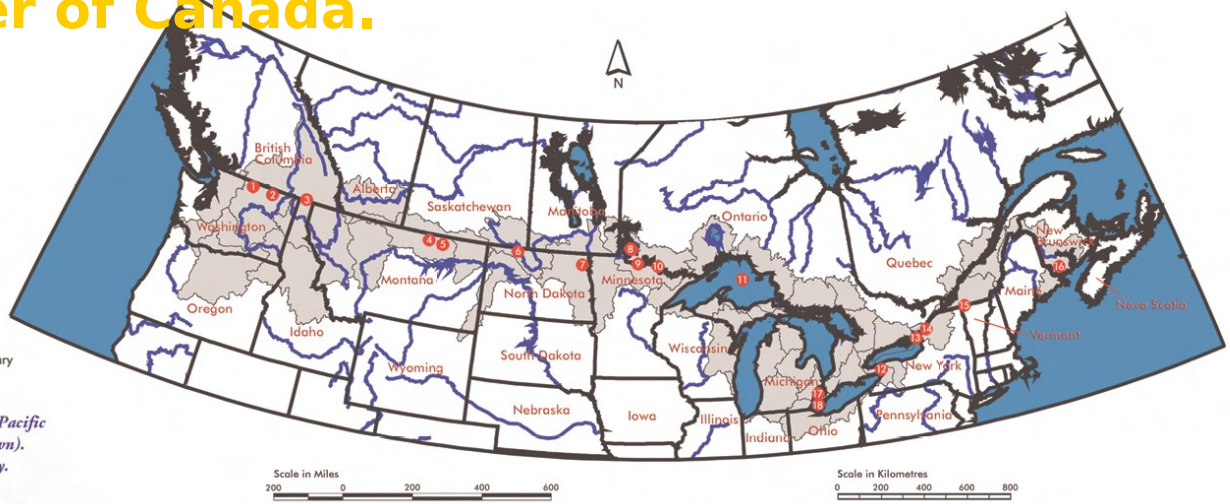
The International Joint Commission was formed in 1912 through the International Boundary Waters Treaty of 1909 to resolve disputes between Canada and the United States over boundary water issues. The six IJC members are appointed by the President of the United States and the Prime Minister of Canada.

1. International [illegible] Board of Control
2. International [illegible] Board of Control
3. International Kootenay Lake Board of Control
4. St. Mary and Milk Rivers Accredited Officers
5. St. Mary and Milk Rivers Administrative Measures Task Force
6. International Souris River Board
7. International Red River Board
8. International Lake of the Woods Control Board
9. International Rainy River Water Pollution Board
10. International Rainy Lake Board of Control
11. International Lake Superior Board of Control
12. International Niagara Board of Control
13. International St. Lawrence River Board of Control
14. International Lake Ontario-St. Lawrence River Study Board (disbanded 2007)
15. International Missisquoi Bay Task Force
16. International St. Croix River Board
17. International Upper Lakes Study Board (new)
18. Great Lakes Water Quality Agreement Boards
    - Great Lakes Water Quality Board
    - Great Lakes Science Advisory Board
    - Council of Great Lakes Research Managers

    Boards active along the entire boundary
    - International Air Quality Advisory Board
    - Health Professionals Task Force

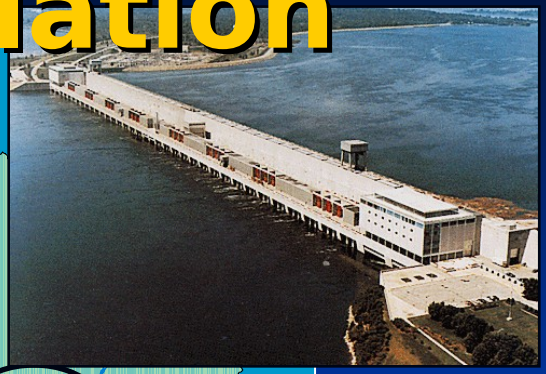
Areas tinted grey represent transboundary basins

The United States and Canada share a boundary that is more than 8,800 kilometres (5,500 miles) long, from the Atlantic Ocean to the Pacific Ocean and on the Alaska-Yukon/British Columbia portion (not shown). Freshwater makes up 3,800 kilometres (2,400 miles) of the boundary.



Planning Community of Practice Conference
San Antonio, TX – May 19-22, 2008

The Great Lakes - Outflow Regulation



Planning Community of Practice Conference
San Antonio, TX – May 19-22, 2008

International Lake Ontario - St. Lawrence River Study

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

Objective:

- Assess how water level fluctuations affect all interests
  - Emphasis on environmental, recreational boating and shoreline property
  - Needs of all interests
  - Consider climate change
- Within the bounds of Article VIII of the Boundary Waters Treaty considering
  - Domestic and sanitary purposes
  - Commercial navigation
  - Hydropower and irrigation

$20M US/ Canada; 5 years completed in May 2006

International Lake Ontario - St. Lawrence River Study

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

IJC

U.S. & Canadian Co-Leads and Study Board - 14 members

U.S. & Canadian Study Managers & Public Affairs Officers

Public Interest Advisory Group
- 22 Members (U.S.+Canadian) appointed by IJC
- Co-Leads on Study Board

Technical Working Groups (TWGs)
- Environment
- Recreational Boating & Tourism
- Coastal Processes
- Commercial Navigation
- Domestic, Industrial & Municipal Water Uses
- Hydroelectric Power
- Hydrology & Hydraulics
- Information Management
- Plan Formulation and Evaluation

Direct ——— Consultative ———

International Lake Ontario - St. Lawrence River Study

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

Plan Formulation and Evaluation Group (PFEG) – responsible for creating alternative outflow management plans. Using "Shared Vision Planning"

- Circle of Influence Meetings
- Fencepost Plans
- Collaborative-Plan Formulation
- Questionnaires

International Lake Ontario - St. Lawrence River Study

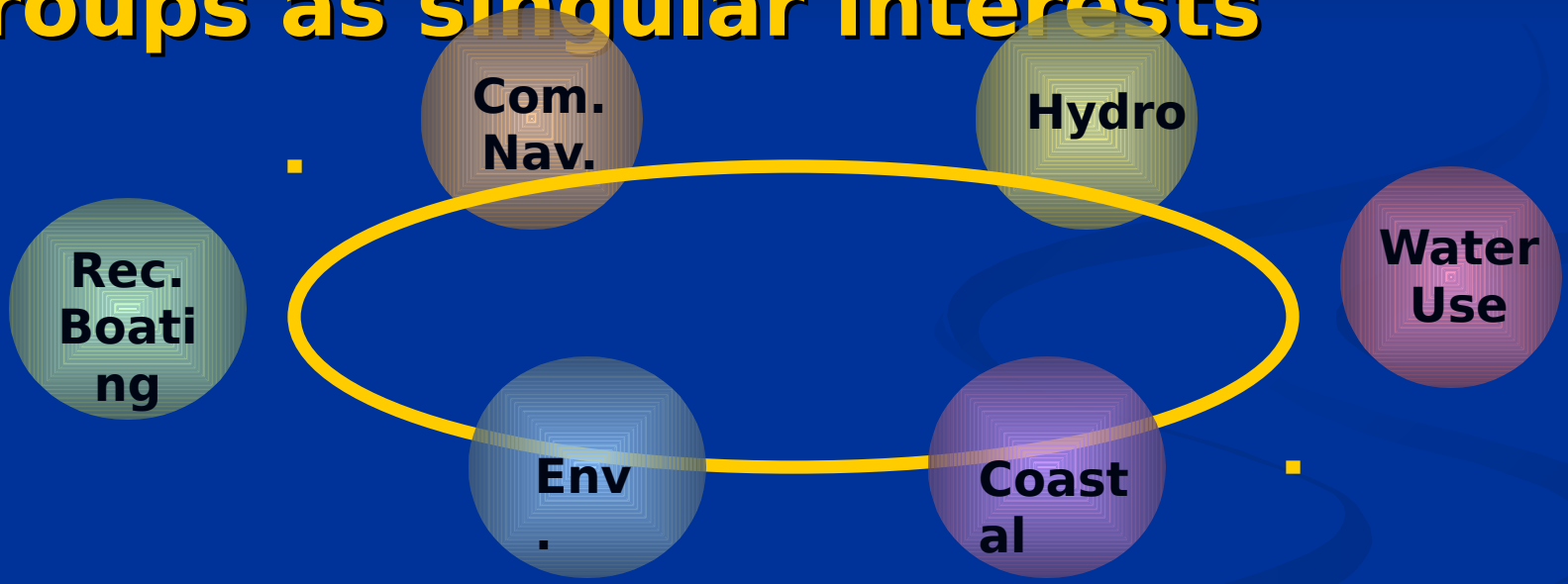
Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

"Circle of Influence" meetings were held with various stakeholder groups, for example:

- Marina operators
- Shoreline property owner coalitions
- Geographically-based groups (1000 Island, Montreal residents)
- Native Americans and First Nations

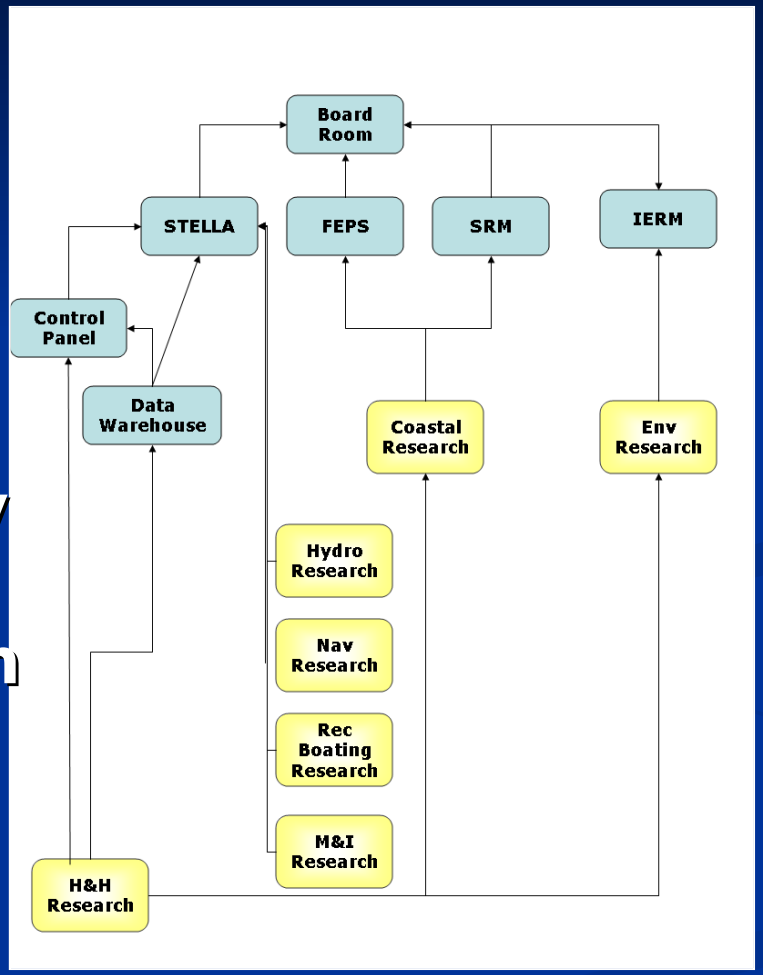
International Lake Ontario - St. Lawrence River Study

"Fencepost Plans" were developed for the Study's Technical Work Groups as singular interests



International Lake Ontario - St. Lawrence River Study

Shared Vision Planning Framework: Collaborative Plan Development



Abbreviations

STELLA – Model programming software

FEPS – Flood and Erosion Prediction System

SRM – St. Lawrence River Model

IERM – Integrated Ecological Response Model

H&H – Hydrology and Hydraulics

Env – Environment

Hydro – Hydropower

Nav – Commercial Navigation

Rec – Recreational Boating

M&I – Municipal, Industrial and Domestic Water Uses

Planning Community of Practice Conference
San Antonio, TX – May 19-22, 2008

International Lake Ontario - St. Lawrence River Study

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

Questionnaires:

Interviews of PIAG members and Study Board to determine opinions on desired conditions and outcomes

"The Board Room" – a spreadsheet which allowed a viewing of possible outcomes, given various hydrologic conditions and interest emphasis

International Lake Ontario - St. Lawrence River Study

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

Metrics of Performance Indicators:

- **Economic PI:**
  - Coastal processes – flooding & erosion
  - Recreational boating & tourism
  - Hydroelectric power generation
  - Commercial shipping
  - Municipal, industrial & domestic water uses
- **Environmental PI:**
  - Over 400 for six indicator groups (wetland vegetation, fish species/ guilds, wetland birds, herptiles (amphibians & reptiles), mammals, species-at-risk)
  - Integrated Ecological Response Model – 32 key indicators

International Lake Ontario - St. Lawrence River Study

Étude internationale sur le lac Ontario et le fleuve Saint-Laurent
International Lake Ontario - St. Lawrence River Study

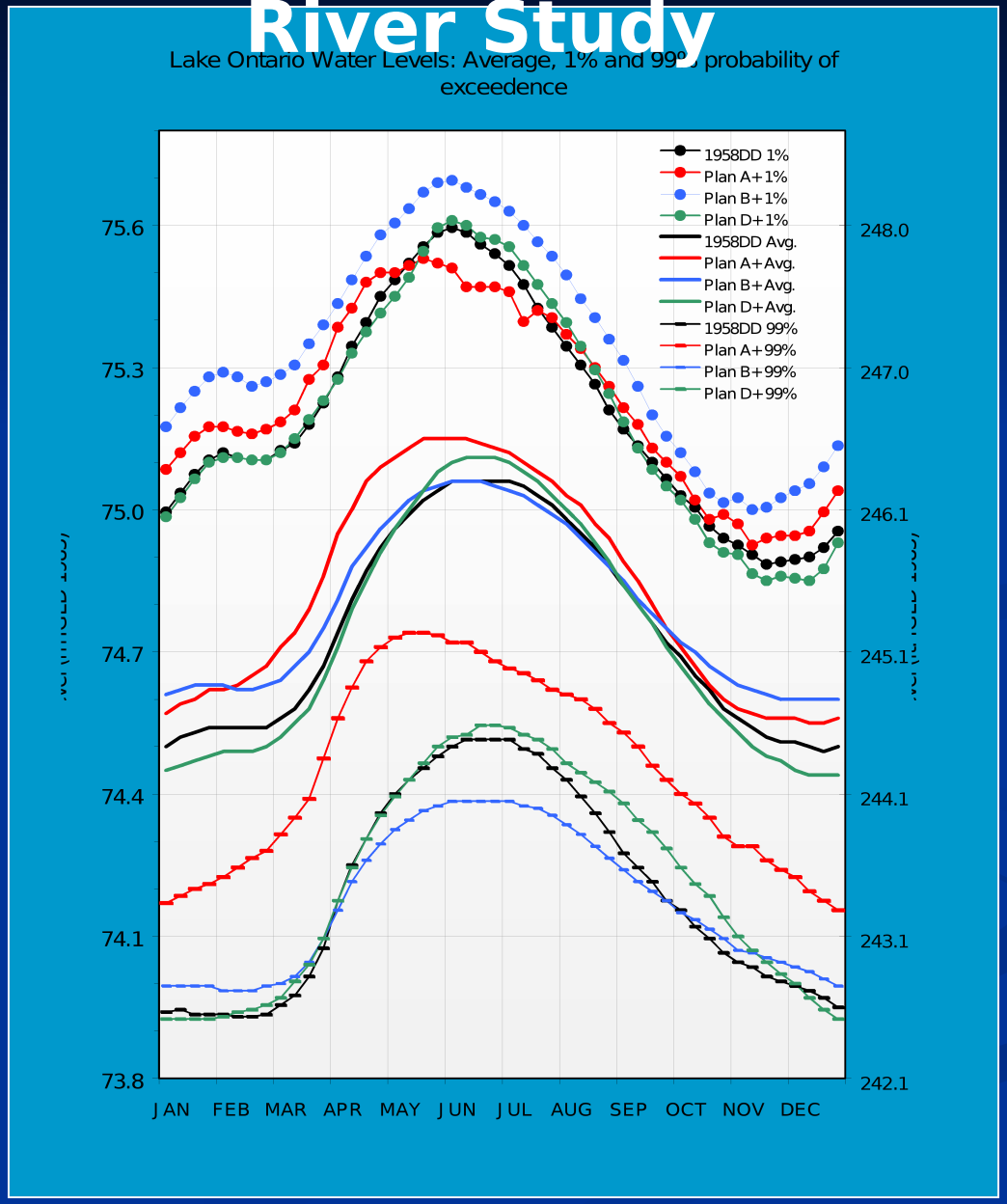
Three alternative plans

- Plan A+ - highest economic benefits
- Plan B+ - overall environmental improvements
- Plan D+ - no disproportionate losses

Based on:

- 1900 through 2001 historic supplies
- 50,000 years of simulated supplies
- Four climate change scenarios

International Lake Ontario - St. Lawrence River Study



International Lake Ontario - St. Lawrence River Study

	Alternative Plans			E
	A+	B+	D+	
Economic Results- Average Annual Net Benefits ($ Million)				
Coastal - Lake Ontario	-$0.36	-$0.60	$0.25	-$23.12
Coastal - Upper St. Law.	0.00	0.00	0.00	-$1.56
Coastal - Lower St. Law.	-$0.25	-$0.51	$0.07	-$1.27
Commercial Navigation	$0.41	$2.20	$2.31	$4.13
Hydropower	$3.50	$5.97	$1.82	$14.16
Rec. Boating -Above Dam	$2.21	-$0.62	$0.52	-$5.91
Rec. Boating -Below Dam	$2.02	$0.04	$1.53	$1.27
Water Uses	0.00	0.00	0.00	0.00
Total	$7.52	$6.48	$6.52	-$12.30
Overall Environmental Index	1.06	1.35	1.10	4.04

ernational Upper Great Lakes Stu

Objectives:

- To investigate St. Clair River flow characteristics and determine how the natural regime of the river has been changed by human activities. Further on-going changes may change the water level relationship between Lakes Michigan-Huron and Erie **(Phase 1)**.
- To investigate whether the current Lake Superior outflow management procedures could be improved considering evolving upper Great Lakes interests and climate change **(Phase 2)**.

$15M US/Canada – completion of all phases by April 2012

ernational Upper Great Lakes Stu

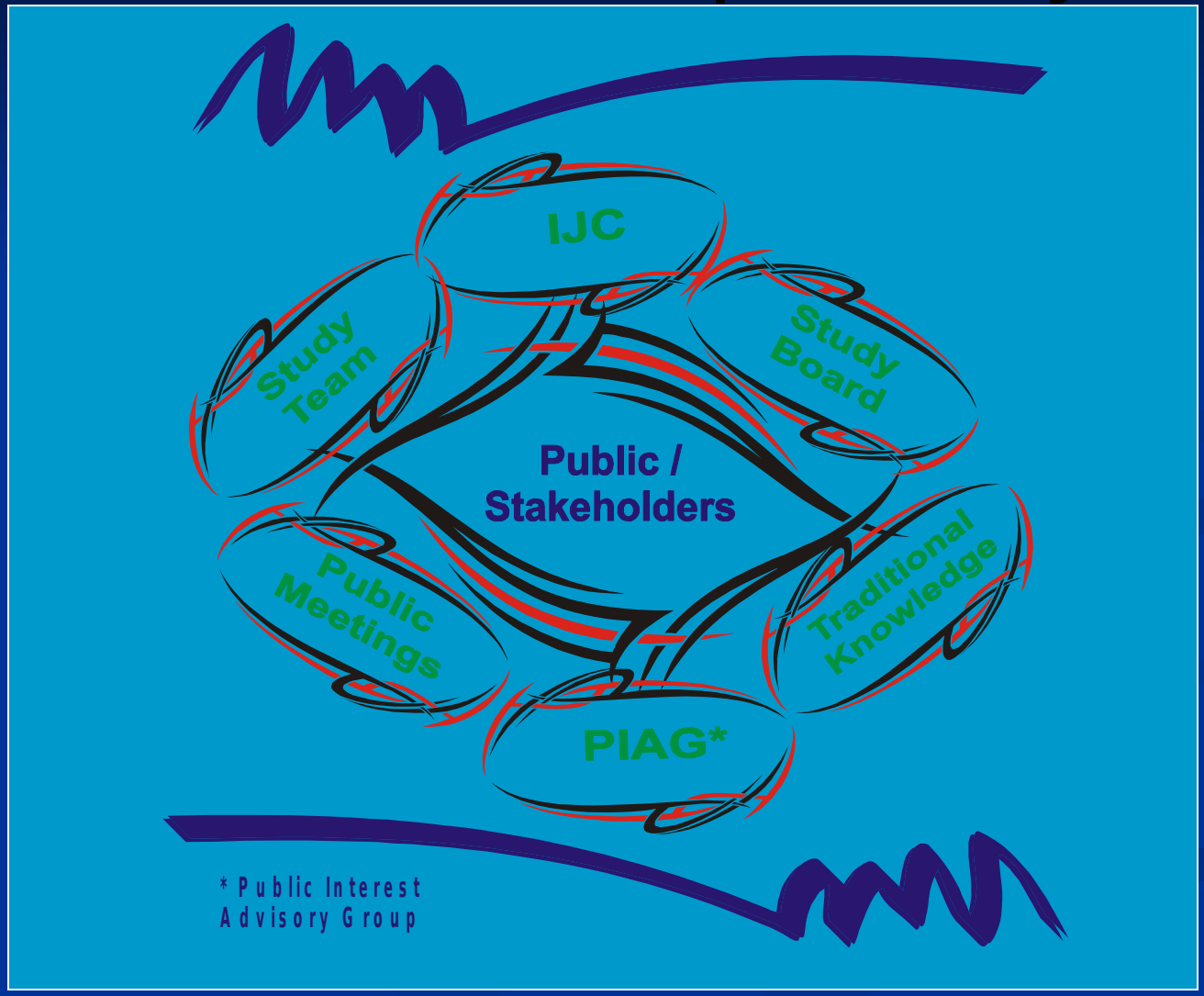
Determine whether the water management options meet contemporary and emerging needs and will manage the system in a sustainable manner evaluating:

- The ecosystem,
- Recreational boating and tourism,
- Hydropower,
- Commercial navigation,
- Municipal, industrial and domestic water uses
- Coastal processes

ernational Upper Great Lakes Stu

- **First Steps toward developing a SVP framework (Year 1):**
  - **“Circle of Influence” Meeting – residents around Muskegon, Michigan**
  - **“Fencepost Plans”**
  - **Questionnaires – Study Board and PIAG**

Public Transparency



International Lake Ontario – St. Lawrence River Study (www.losl.org)
and International Upper Great Lakes Study (www.iugls.org)
Questions?